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Class: SY-MCA   **Shift / Div:** A   **Batch:** S2   **Roll Number:** 52043

Name: Vanessa Reetu Prashant More   **Assignment No:** 1   **Date of Implementation:** 23. 9. 23

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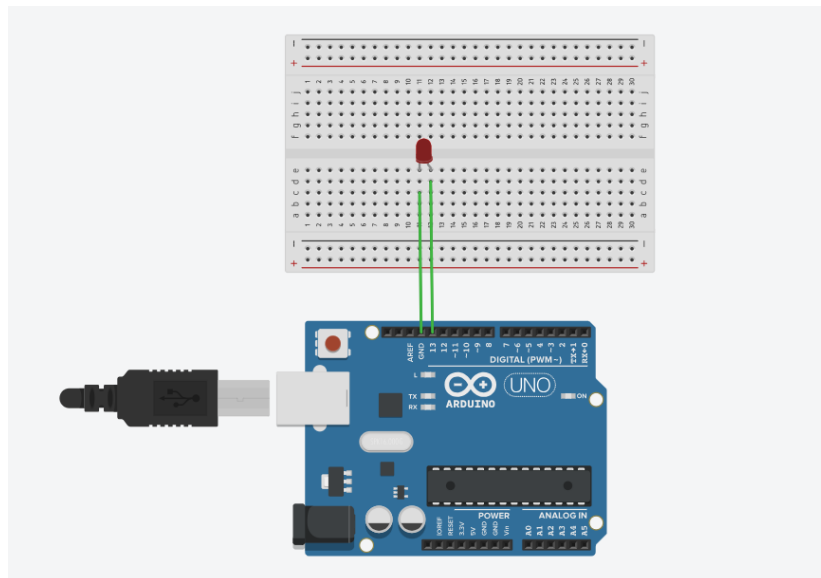
A. Study of Raspberry-Pi, Beagle board, Arduino and other micro controller (History & Elevation)

B. Write an application for Led Light Blinking

Code:

```
void setup()
{
 pinMode(LED_BUILTIN, OUTPUT);
}

void loop()
{
 digitalWrite(LED_BUILTIN, HIGH);
 delay(1000); // Wait for 1000 millisecond(s)
 digitalWrite(LED_BUILTIN, LOW);
 delay(1000); // Wait for 1000 millisecond(s)
}
```

Name: Vanessa More

Roll no: 52043   Batch: 52

SYMCA   Div: A

Subject: IoT

Assignment 1

Q. A Study of Raspberry-Pi, Beagle board, Arduino and other micro controller (History & Elevation).

Ans __Raspberry Pi.__

__History:__

- The Raspberry Pi project was founded in 2006 by Eben Upton & his colleagues at the University of Cambridge's Computer Laboratory.
- Their goal was to create an affordable, credit-card sized computer to encourage computer science education & programming skills.
- The first Raspberry Pi model, the Raspberry Pi 1 Model B, was released in 2012.

__Elevation:__

- Raspberry Pi has significantly elevated the accessibility of computing technology for learners, educators and enthusiasts
- It has been a game changer in education, enabling students to experiment with hardware and software in a cost-effective manner.
- Raspberry Pi's Linux-based operating systems provide

a real-world computing environment, preparing students for careers in technology.

- It has empowered countless projects, from DIY home automation to retro gaming consoles, thereby fostering innovation and creativity.

Beagle Board :

History :

- The BeagleBoard project began in 2008 with the aim of creating open-source single board computers for embedded development.
- The original BeagleBoard was designed by Gerald Coley and introduced as a low-cost, high-performance development platform.

Elevation :

- BeagleBoard has elevated embedded systems development by offering powerful processors, expandable I/O capabilities & Linux support.
- It is widely used in robotics, automation and prototyping, enabling developers to create sophisticated system.
- The BeagleBoard community has contributed to software development & expansion boards, expanding its capabilities and applications.

Arduino.

History :

- Arduino's history dates back to 2005 when a group of Italian students and engineers, including Massimo Banzi and David Cuartielles, developed the first Arduino board.
- Their vision was to create an accessible platform for artists, designers & hobbyists to create interactive electronic projects.
- The first official Arduino board was the Arduino Diecimila, released in 2007.

Elevation :

- Arduino has elevated the world of electronics by making microcontroller - based projects accessible to beginners & enthusiasts.
- It has revolutionized education by integrating into curricula & providing a practical way of learning electronics & programming.
- The Arduino community has expanded the platform with various board models & shields making it versatile for various applications.
- Arduino's open - source nature has spurred innovation, from simple LED blinking projects to complex IoT solutions.

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Class: SY-MCA   **Shift / Div:** A   **Batch:** S2   **Roll Number:** 52043

Name: Vanessa Reetu Prashant More   **Assignment No:** 2   **Date of Implementation:** 30. 9. 23

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Understanding the connectivity of Raspberry-Pi /Beagle board circuit with temperature sensor.
Write an application to read the environment temperature. If temperature crosses a threshold value, the application indicated user using LEDSs

Code:

```
const int hot = 87; //set hot parameter
const int cold = 75; //set   cold parameter
void setup() {
        pinMode(A2, INPUT); //sensor
        pinMode(2, OUTPUT);   //blue
        pinMode(3, OUTPUT); //green
        pinMode(4, OUTPUT); //red
        Serial.begin(9600);
}
void   loop() {
int sensor = analogRead(A2);
 //int sensor =1307;
float voltage = (sensor / 1024.0) *   5.0;
float tempC = (voltage - .5) * 100;
float tempF = (tempC * 1.8) + 32;
Serial.print("temp:   ");
Serial.print(tempF);
if (tempF < cold) { //cold
        digitalWrite(2, HIGH);
        digitalWrite(3,   LOW);
        digitalWrite(4, LOW);
        Serial.println(" It's Cold.");
}
else   if (tempF >= hot) { //hot
        digitalWrite(2, LOW);
        digitalWrite(3, LOW);
        digitalWrite(4,   HIGH);
        Serial.println(" It's Hot.");
}
else { //fine
        digitalWrite(2,   LOW);
```

```
        digitalWrite(3, HIGH);
        digitalWrite(4, LOW);
        Serial.println(" It's   Fine.");
}
delay(10);
}}
```
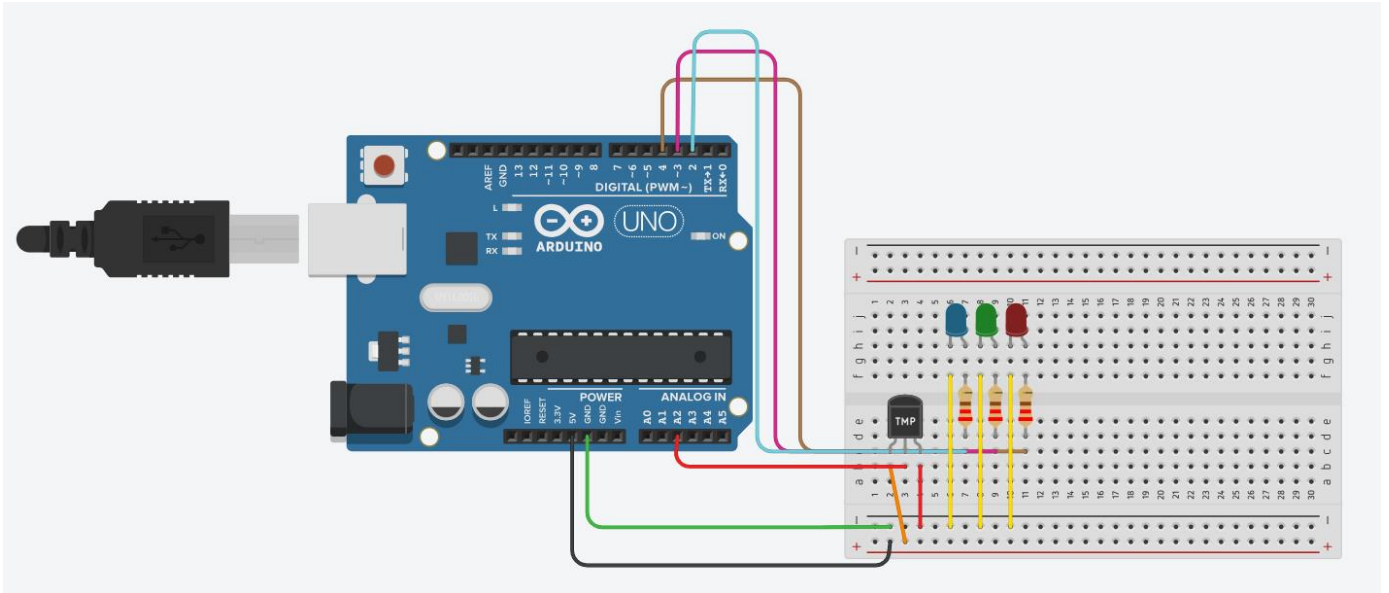
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Class: SY-MCA   **Shift / Div:** A   **Batch:** S2   **Roll Number:** 52043

Name: Vanessa Reetu Prashant More   **Assignment No:** 3   **Date of Implementation:** 26. 10. 23

****

Write an application to detect obstacle and notify user using LEDs.

Code:

```
#define IR_RECV_PIN 3
#define IR_SEND_PIN 2
unsigned long send_time = 0UL;
unsigned long recv_time = 0UL;
void falling_edge_detected(void);
void wait(unsigned long milliseconds);
void pulse_LED(int led_pin, unsigned long duration);
void setup()
{
// Initialize the serial monitor. use a baud rate of 9600 bps
Serial.begin(9600);
// Initialize the I/O pins
pinMode(LED_BUILTIN, OUTPUT);
pinMode(IR_SEND_PIN, OUTPUT);
pinMode(IR_RECV_PIN, INPUT);
attachInterrupt(digitalPinToInterrupt(IR_RECV_PIN), falling_edge_detected, FALLING);
Serial.print("Ready!");
}
void falling_edge_detected(void)
{
recv_time = millis();
}
void pulse_LED(int led_pin, unsigned long duration)
{
digitalWrite(IR_SEND_PIN, HIGH);
wait(10);
digitalWrite(IR_SEND_PIN, LOW);
wait(10);
}
void wait(unsigned long milliseconds){
unsigned long start = millis();
while(millis() - start < milliseconds);
}
void loop()
```

```
{
send_time = millis(); pulse_LED(IR_SEND_PIN, 10);
unsigned long d = recv_time - send_time;
if(recv_time >= send_time && d <= 2)
{
Serial.print(send_time); Serial.print(", ");
Serial.print(recv_time); Serial.print(", ");
Serial.println(d);
digitalWrite(LED_BUILTIN, LOW);
}
else
{
 Serial.println("Obstacle detected!");
 digitalWrite(LED_BUILTIN, HIGH);
}
wait(250);
}
```
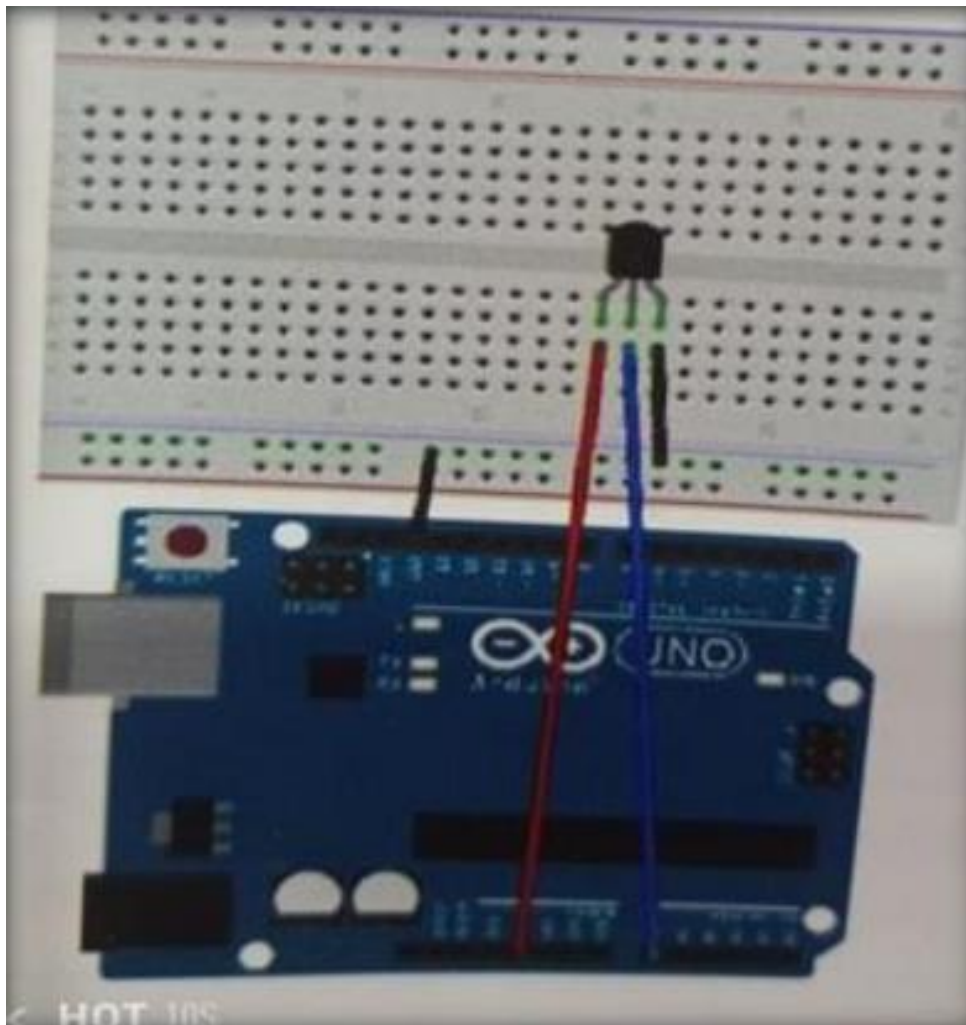
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Class: SY-MCA   **Shift / Div:** A   **Batch:** S2   **Roll Number:** 52043

Name: Vanessa Reetu Prashant More   **Assignment No:** 4   **Date of Implementation:** 26. 10. 23

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Write an application using Raspberry-Pi /Beagle board to control the operation of stepper motor

Using Raspberry Pi

Code:

```
import RPi.GPIO as IO
import time
IO.setwarnings(False)
x=1
IO.setmode (IO.BCM)
IO.setup(5,IO.OUT)
IO.setup(17,IO.OUT)
IO.setup(27,IO.OUT)
IO.setup(22,IO.OUT)
IO.setup(19,IO.IN)
IO.setup(26,IO.IN)
while 1:
IO.output(5,1)
IO.output(22,0)
for y in range(x):
time.sleep(0.01)
IO.output(17,1)
IO.output(5,0)
for y in range(x):
time.sleep(0.01)
IO.output(27,1)
IO.output(17,0)
for y in range(x):
time.sleep(0.01)
IO.output(22,1)
IO.output(27,0)
for y in range(x):
time.sleep(0.01)
if(IO.input(26) == False):
if(x<100):
x=x+1
time.sleep(0.5)
```

```
if(IO.input(19) == False):
if(x>1):
x=x-1
time.sleep(0.5)
```



```
if(IO.input(19) == False):
if(x>1):
x=x-1
time.sleep(0.5)
```
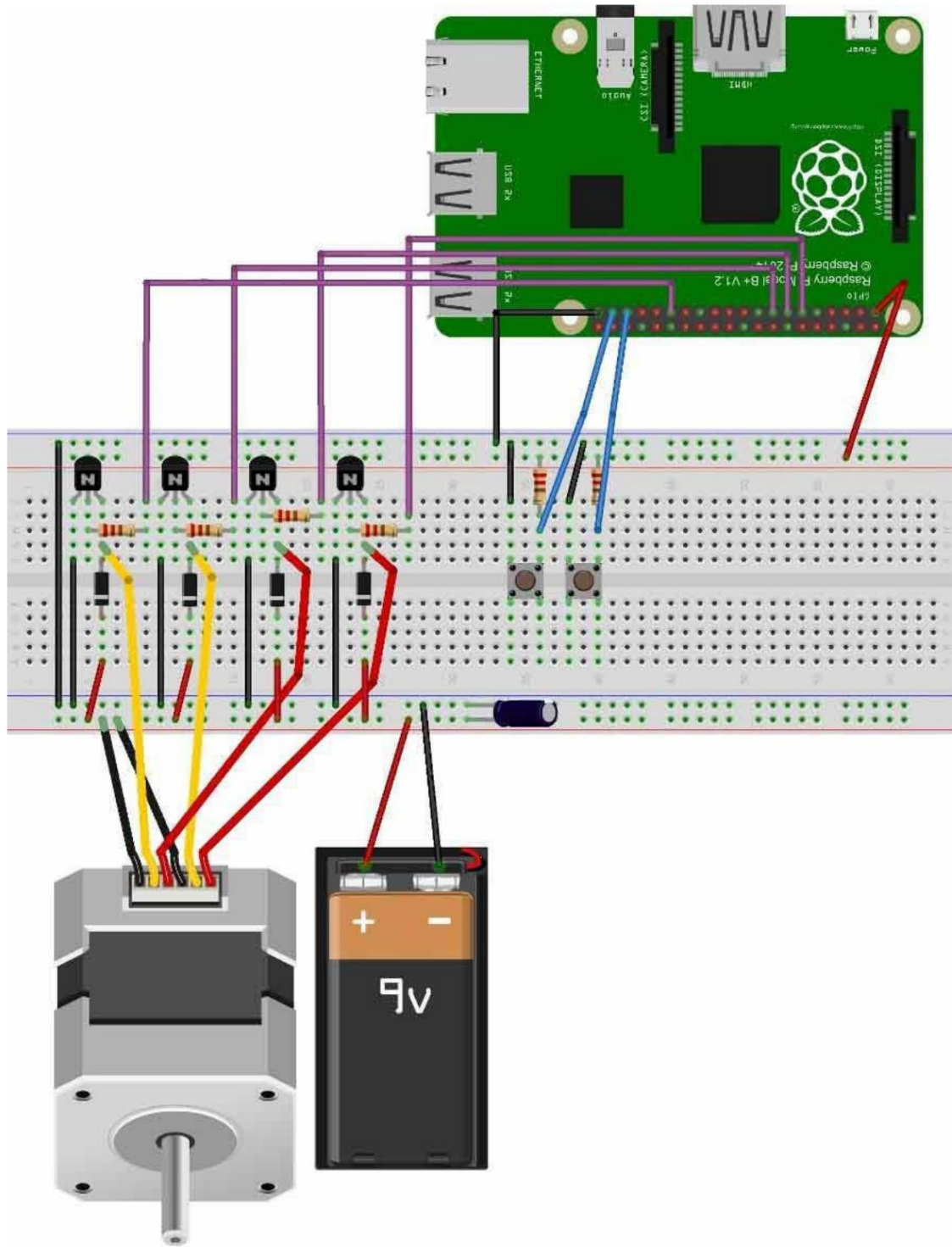
Using Arduino Uno
Code:

```
#include <Stepper.h>:

const int stepsPerRevolution = 200;

Stepper myStepper(stepsPerRevolution, 8, 9, 10, 11);

int stepCount = 0;
void setup() { }

void loop() {
  int sensorReading = analogRead(A0);
  int motorSpeed = map(sensorReading, 0, 1023, 0, 250);
  if (motorSpeed > 0) {
    myStepper.setSpeed(motorSpeed);
    myStepper.step(stepsPerRevolution / 100);
  }
}
```